

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

**PAT. & T.M. OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte JANE CHI-YA CHENG, TERRY EUGENE HELTON,
DOMINICK NICHOLAS MAZZONE and DENNIS E. WALSH

Appeal No. 2000-1007
Application 08/853,007

ON BRIEF

Before GARRIS, WARREN and WALTZ, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

Decision on Appeal

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner finally rejecting claims 1 through 10, which are all of the claims in the application. Claim 1 is illustrative of the claims on appeal:

1. A process for producing alkyl aromatic compounds which comprises contacting at least one aromatic compound with at least one alkylating agent or transalkylating agent possessing at least one aliphatic group having from 1 to 5 carbon atoms under alkylation or transalkylation reaction conditions and in the presence of an alkylation or transalkylation catalyst, to provide an alkylated aromatic product possessing at least one alkyl group derived from said alkylating agent or transalkylating agent, said catalyst comprising a binder-free molecular sieve having an X-ray diffraction pattern that includes the lines set forth in Table A.

The appealed claims, as represented by claim 1, are drawn to a process for producing an alkylated aromatic compound which comprises at least alkylation or transalkylation with at least one alkylating agent or transalkylating agent in the presence of a catalyst comprising at least a binder-free molecular sieve having an X-ray diffraction pattern that includes the lines set forth in specification Table A. A molecular sieve having an X-ray diffraction pattern that includes the lines set forth in Table A is MCM-22 (specification, page 7, line 11; appealed claim 10).

The reference relied on by the examiner is:

Kushnerick et al. (Kushnerick)	4,992,606	Feb. 12, 1991
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The examiner has rejected appealed claims 1 through 10 under 35 U.S.C. § 102(b) as being anticipated by Kushnerick. The examiner has rejected appealed claims 1 through 10 under 35 U.S.C. § 103(a) as being unpatentable over Kushnerick.

Appellants, in the brief (page 4), group the appealed claims thusly: appealed claims 1 through 6, 8 and 10; and appealed claims 7 and 9. Thus, we decide this appeal based on appealed claims 1 and 9. 37 CFR § 1.192(c)(7) (1997).

We affirm both grounds of rejection with respect to appealed claims 1 through 6, 8 and 10, and reverse with respect to appealed claims 7 and 9.

Rather than reiterate the respective positions advanced by the examiner and appellants, we refer to the examiner's answer and to appellants' brief for a complete exposition thereof.

Opinion

As an initial matter, we find that, when considered in light of the written description in the specification as interpreted by one of ordinary skill in this art, *see, e.g., In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997), the plain language of appealed claim 1 requires a "catalyst comprising a *binder-free* molecular sieve" (emphasis supplied), whether further characterized in appealed claim 1 by "an X-ray diffraction pattern" or in appealed claim 10 as "MCM-22." Appellants have set forth in the written description in the specification that "[t]he term 'binder-free' as used herein describes the synthetic porous crystalline material or molecular sieve as being *substantially free or free* of binder material such as clays or metal oxides, i.e., alumina or silica" (page 11, lines 32-34; emphasis supplied). Accordingly, we must interpret the term "binder-free" in claim 1 in the manner that appellants

have defined it. *See Morris, supra* (“[T]he PTO applies to the verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant’s specification.”); *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) (“During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow. When the applicant states the meaning that the claim terms are intended to have, the claims are examined with that meaning, in order to achieve a complete exploration of the applicant’s invention and its relation to the prior art. *See In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969) (before the application is granted, there is no reason to read into the claim the limitations of the specification.).”

Thus, we interpret the claim term “binder-free” to permit the inclusion to some extent of “binder material such as clays or metal oxides, i.e., alumina or silica” which performs the function as a “binder” and does not form a part of the crystalline molecular sieve for another purpose. With respect to the extent that binder material can be included, we point out that the term “substantially free” is a term of degree for which the written description in the specification must either provide a definition or some standard of measurement for the claim term that it modifies, or that term will be given its broadest reasonable ordinary meaning of from free to largely but not wholly free. *See Morris, supra; York Prods., Inc. v. Central Tractor Farm & Family Ctr.*, 99 F.3d 1568, 1572-73, 40 USPQ2d 1619, 1622-23 (Fed. Cir. 1996) (“In this case, the patent discloses no novel use of claim words. Ordinarily, therefore, ‘substantially’ means ‘considerable in . . . extent,’ *American Heritage Dictionary Second College Edition* 1213 (2d ed. 1982), or ‘largely but not wholly that which is specified,’ *Webster’s Ninth New Collegiate Dictionary* 1176 (9th ed. 1983).”); *Seattle Box Co., Inc. v. Industrial Crating & Packing Inc.*, 731 F.2d 818, 826, 221 USPQ 568, 573-74 (Fed. Cir. 1984) (“Definiteness problems arise when words of degree are used. That some claim language may not be precise, however, does not automatically render a claim invalid. When a word of degree is used . . . [it] must [be determined] whether the patent’s specification provides some standard for measuring that degree.”); *In re Mattison*, 509 F.2d 563, 564-65, 184 USPQ 484, 486 (CCPA 1975); *cf. In re*

Marosi, 710 F.2d 799, 802-03, 218 USPQ 289, 292 (Fed. Cir. 1983) (the generally guidelines in appellants' specification with respect to the term "essentially free of alkali metal" permitted a person of ordinary skill in the art to "draw the line between unavoidable impurities in starting materials and essential ingredients"). We point out in this respect, it is appellants' burden to define the claimed invention encompassed by the appealed claims in the specification. *See Morris*, 127 F.3d at 1055-56, 44 USPQ2d at 1029.

We fail to find any guidelines in appellants' specification which would define the extent to which the molecular sieve can contain binder material and meet the "substantially free" limitation included in the term "binder-free" appealed claim 1. However, while this raises the issue of whether the appealed claims comply with the provisions of 35 U.S.C. § 112, second paragraph, we find that a reasonable, conditional interpretation of claim 1 that is adequate for purposes of resolving prior art issues in this appeal can be made without unsupported speculative assumptions, and thus, for purposes of this appeal, we conditionally interpret the cited phrase to mean that the molecular sieve can be completely free of or can contain small amounts of binder material. *Cf. In re Steele*, 305 F.2d 859, 862-63, 134 USPQ 292, 295 (CCPA 1962); *Ex parte Saceman*, 27 USPQ2d 1472, 1474 (Bd. Pat. App. & Int. 1993).¹

Upon comparing the claimed process encompassed by appealed claim 1 as we have interpreted this claim above, with the teachings of Kushnerick, we find ourselves in agreement with the examiner that, *prima facie*, the claimed process is anticipated by the disclosure of the reference within the meaning of § 102(b) (answer, page 3). In this respect, it is well settled that the examiner has the burden of making out a *prima facie* case of anticipation under § 102(b) in the first instance by pointing out where each and every element of the claimed invention, arranged as required by the claim, is described identically in a single reference, either expressly or under the principles of inherency, in a manner sufficient to have placed a person of ordinary skill in the art in possession thereof. *See generally, In re Spada*, 911 F.2d 705, 708, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990). It is also well settled that if a reference does not disclose a specific

¹ While we have so considered appealed claim 10, the matter of whether this claim and other claims which contain such language comply with § 112, second paragraph, should be addressed by the examiner upon any further consideration of the appealed claims subsequent to this appeal.

embodiment which satisfies all of the claim limitations, the reference will nonetheless describe the claimed invention within the meaning of § 102(b) if it “clearly and unequivocally . . . [directs] those skilled in the art to [the claimed invention] without *any* need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference.” *In re Arkley*, 455 F.2d 586, 587, 172 USPQ 524, 526 (CCPA 1972). Whether a reference provides clear and unequivocal direction to the claimed invention is determined on the total circumstances with respect to the disclosure of the reference, *see In re Petering*, 301 F.2d 676, 682, 133 USPQ 275, 280 (CCPA 1962), including “not only specific teachings of the reference but also the inferences which one of ordinary skill in the art would reasonably be expected to draw therefrom.” *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968); *see also In re Graves*, 69 F.3d 1147, 1152, 36 USPQ2d 1697, 1701 (Fed. Cir. 1995), and cases cited therein (a reference anticipates the claimed method if the step that is not disclosed therein “is within the knowledge of the skilled artisan.”). Such direction is provided to one of ordinary skill in the art where the totality of the reference provides a “pattern of preferences” which describes the claimed invention without the necessity for judicious selection from various disclosures thereof. *See In re Sivaramakrishnan*, 673 F.2d 1383, 213 USPQ 441 (CCPA 1982); *In re Schaumann*, 572 F.2d 312, 316-17, 197 USPQ 5, 9-10 (CCPA 1978); *Petering*, 301 F.2d at 681-82, 133 USPQ at 279-80.

We find that Kushnerick clearly discloses to one of ordinary skill in this art a process for the alkylation of an aromatic compound with a short chain alkylating agent in the presence of molecular sieves, including zeolite MCM-22, which not only have an X-ray diffraction pattern that includes the lines set forth in specification Table A, but are also “binder-free” as the term is used in claim 1 (e.g., title; abstract; col. 1, lines 16-20; col. 2, line 64, to col. 3, line 9; col. 4, line 64, to col. 6, line 56; col. 6, line 57, to col. 9, line 5; col. 10, lines 27-42; Examples 1-14 and 16; and patent claims 1-14). It is clear that the whole of Kushnerick is directed to a process for preparing short chain alkyl aromatic compounds and that the presence of binder material in the molecular sieve used in the process is expressly optional. Indeed, in comparison with the disclosure in Kushnerick Example 15 that “[a] portion of the zeolite crystals was combined with Al₂O₃ to form a mixture of 65 parts, by weight, zeolite and 35 parts Al₂O₃” (col. 16, lines 7-9),

which mixture appellants use in specification Comparative Example 1 to demonstrate a binder containing molecular sieve (pages 12-13), and the disclosure at col. 9, lines 15-42, it is apparent to us that either the molecular sieve of each of Kushnerick Examples 1 through 14 is free of binder material or contains so little binder material as to still be “binder-free” as that claim term is defined in appellants’ specification.

Thus, based on this evidence, it is apparent that, *prima facie*, there is in Kushnerick clear and unequivocal direction to select a binder-free molecular sieve instead of an expressly optional binder containing molecular sieve, as the catalyst for the alkylation of short chain alkyl aromatic compounds with short chain alkylating agents, thus arriving at each and every element of the claimed alkylation process encompassed by claim 1, arranged as required in the claim, in a manner sufficient to have placed one of ordinary skill in the art in possession of that process without the need to pick and choose various disclosures of the reference nor directly related to each other, even though the reference does not disclose an example which satisfies all of the claim limitations.

In view of the *prima facie* case of anticipation made out over Kushnerick, we have again evaluated all of the evidence of anticipation and non-anticipation based on the record as a whole, giving due consideration to the weight of appellants’ arguments in the brief. *Spada*, F.2d at 708, 15 USPQ2d at 1657.

Appellants submit that Kushnerick “does not actually disclose an alkylation process using a catalyst comprising a binder-free molecular sieve;” that from col. 9, lines 28-35, “the catalysts envisioned by [Kushnerick] relate to crystalline materials in combination with inactive materials (such as metal oxides, col. 9, line 21), with said inactive materials being further incorporated into binders;” and that “an alkylation example in [Kushnerick] (Example 15, columns 15 and 16) teaches a catalyst which contains a binder,” in contending that “[a]t most, this reference would put one of ordinary skill in the art in immediate possession of a catalytic process wherein the catalyst contains a binder” and thus “is not a proper reference under 35 U.S.C. § 102(b)” (brief, pages 5-6). The examiner points out that “the binder is not a requirement but a ‘desirable’ component to improve crush strength when such crush-strength improvement is [called] for” (answer, page 4).

We must agree with the examiner. The disclosure on which appellants rely and which is considered by the examiner is found at col. 9, lines 15-42, of Kushnerick. We find that this disclosure would have fairly taught one of ordinary skill in this art that a binder can be used but is not necessary for the practice of the disclosed alkylation process. Indeed, further evidence that the binder is optional is found in the disclosure with respect to the “[a]lkylation of an alkylatable aromatic compound in accordance with the invention” wherein the “WHSV is based upon the total weight of active catalyst (and binder if present)” (col. 10, lines 27-42). Thus, the fact that Kushnerick may have included an example of an alkylation process using a molecular sieve with a binder, Example 15, but not an *apparent* example of an alkylation process using a binder-free molecular sieve, does not militate against anticipation. We note in this respect that Kushnerick Example 16 “illustrates the alkylation of cuxene [sic] with propylene in the presence of the present zeolite” and appellants, this application and Kushnerick being commonly assigned, have not stated and the examiner has not determined whether the “present zeolite” does or does not contain a binder.

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of anticipation found in Kushnerick with appellants’ countervailing evidence of and argument for no anticipation in fact and find that the claimed invention encompassed by appealed claims 1 through 6, 8 and 10 is anticipated as a matter of fact under 35 U.S.C. § 102(b).

With respect to the ground of rejection of appealed claims 1 through 6, 8 and 10 under § 103(a), our determination that the claimed process encompassed by appealed claim 1 is anticipated by Kushnerick is dispositive because it is well settled that “anticipation is the ultimate of obviousness.” *See In re Baxter Travenol Labs.*, 952 F.2d 388, 392, 21 USPQ2d 1281, 1284-85 (Fed Cir. 1991), citing *In re Fracalossi*, 681 F.2d 792, 794, 215 USPQ 569, 571 (CCPA 1982). Thus, to the extent that Kushnerick anticipates the claimed processes, the case of obviousness is irrebuttable. *Fracalossi, supra*. In this respect, we have not considered appellants’ evidence as relied on in the brief with respect to the this ground of rejection under § 103(a) because evidence submitted to establish nonobviousness is irrelevant to anticipation.

Appeal No. 2000-1007
Application 08/853,007

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